Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Academic Year (2022-23)
Year: 3 Semester: V

Program: B.Tech Mechanical Engineering Max. Marks: 75
Subject: Introduction to Robotics (DJ19MN5C1) **Time: 10:30 am to 1:30 pm**
Date: 03/01/2022
Duration: 3 Hours

REGULAR EXAMINATION

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.
(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagrams, wherever necessary.
(8) Each question is set from one module, Q1, 2, 3, 4 is related to module/unit 1, 2, 3 & 4.
(9) Q5 is related to module/unit 5 & 6.

Question No.	Particulars of the question	Max. Marks
Q1 (a)	What is programmable automation, explain with neat sketches.	5
(b)	Write the three Issac Asimov's laws of robotics.	4
(c)	Brief out the classification of robots based on motion control.	6
	OR	
(a)	Explain what is tool orientation, explain Yaw, Pitch & Roll.	7
(b)	Write a note on the generations of robots similar to generations of computers.	4
(c)	Explain the different between a link & a joint of a robot arm with a neat drawing.	4
Q2 (a)	Explain the correlation between human anatomy & robotic anatomy	5
(b)	What do you mean by hybrid drives, explain	5
(c)	Interpret what are hydraulic actuators and for what purpose they are use for.	5
	OR	
(a)	What are the pneumatic drive applications in robotics ?	5
(b)	Explain power transmission devices that could be used in robotics ?	5
(c)	Explain the types of electrical motors / actuators used in robots.	5

Q3 (a)	What are force sensors, explain them.	6
(b)	Explain tactile sensors in brief with a neat sketch or a diagram.	4
(c)	Write a note on position & velocity sensors	5
	OR	
(a)	Explain the proximity sensors & its application with a neat diagram	5
(b)	What are potentiometric (pots) sensors, write its block-diagram & its applications.	5
(c)	In detail, explain the infra-red sensors with diagrams.	5
Q4 (a)	AMS-Define Articulated Mechanical System with a neat sketch, explain the parts.	6
(b)	What are tools & grippers that are used as end-effectors in robotic manipulators.	5
(c)	Write a note on pneumatic grippers for picking up glass/paper/delicate objects.	4
	OR	
(a)	What is need for a robot wrist similar to human wrist, for what purpose it is used?	4
(b)	Explain the types of gripper actuations that are used for actuating the grippers.	5
(c)	Write a note on the materials used for designing a particular robot.	6
Q5(a)	Explain what a robot brain or robot controller is, define it.	5
(b)	List out the different types of robotic programming languages that could be used for programming of robots.	5
(c)	What is on-line programming & off-line programming of robots.	5
	OR	
(a)	Explain the space applications of robots that could be used for various applications.	6
(b)	Explain the social, environmental & economic issues in robotic applications.	5
(c)	What are the applications of nanorobots & microbots in medicine ?	4